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the pore-canal into the hair; but the same is enclosed by epithelial cells which surround the pore-canal.

Kraepelin thus sums up our present knowledge of the olfactory organs of Coleoptera: *The terminal apparatus of the organ of sense in the antennæ of beetles consists in each case of a chitinous, delicate or thick, long or short hair-like structure, which is planted in the middle of a more or less arched, "dome-like membrane" closing in the wide pore-canal of the antennal wall. This membrane extends over the pore-canal at the same level as the surface of the antennal integument* (Geotrupes, Strangalia), *or it rises as a cupola in the middle of a beaker-shaped pit* (Melolontha, Buprestidæ, Dytiscidæ). *Often such sense-organs* (*either with or without special pits*) *are so united that they stand associated in flat depressions of the surface of the antennæ, the so-called "compound" pits* (Melolontha, Strangalia, Euchroma, Lucanus, etc.).—*K. Kraepelin.*

ZOOLOGY.

Mimicry in Amphipods.—Dr. Carl Bovallius describes (*Nova Acta Reg. Soc. Sci. Upsaliensis*, xviii., 1886) a new genus of Hyperid Amphipods, the three species of which are remarkable for their mimicry of jelly-fishes. The head and five, six, or all seven of the thoracic segments are enormously inflated, so that the anterior part of the body closely resembles the bell of a medusa, while the feet and compressed abdomen hang down like the tentacles of the mimicked form. For these forms the generic name Mimonectes is proposed, and even a new family has to be instituted. Among the other more remarkable characters are the following: The eyes "do not form a continuous mass on each side of the head as in the other Hyperids, but consist of six to ten large ocelli scattered over the lower side of the head. These do not show such long crystallic [*sic*] elements as in Phronima, Rhabdosoma, and others, but seem to be composed each of a great many granular, fine, light-breaking corpuscles interspersed with dark brown pigment." The innervation of these ocelli is peculiar; some receive their nerve-supply directly from the brain, while in others the filaments seem to arise from the œsophageal commissures. Whether this is actually the case or not remains to be determined by sections of fresh specimens, but it is interesting to note that all the ocellar nerves (except two) arise *behind* the nerves supplying the antennæ. The "bell" of the animal is filled with a liquid enclosed by a thin pellucid membrane, but as all the material was alcoholic, the nature of the fluid could not be ascertained. The alimentary canal showed no traces of cæca or hepatic glands. The three species are *Mimonectes loveni*, from the Atlantic; *M. sphæricus*, from near the Canary Isles; and *M. steenstrupii*, from the mouth of Davis Strait.

Australian Cladocera.—It is a well-known fact that the eggs of various fresh-water animals (notably those of Entomostraca) will withstand long desiccation, but still the experiments detailed by Mr. G. O. Sars have considerable interest. A correspondent sent him in Christiania, Norway, some dried mud from the shores of a fresh-water lake in tropical Australia. This mud was placed in water, and from it were hatched out one Copepod, one Ostracode, a species of Polyzoan, apparently belonging to the genus Plumatella, and five species of Cladocera. These last are made the subject of an article of nearly fifty pages and eight plates in the *Forhandlinger Vidensk. Selsk. Christiania* for 1885 (1886). These species all belonged to genera (Daphnia, Diaphanosoma, Ceriodaphnia, Moina, and Leydigia) already known from European waters, and the species themselves closely resembled those of the antipodes, notwithstanding that they came from localities thousands of miles apart and which have entirely different environments. These facts recall to the author the close similarity—even identity—of the crustacean species of Italy and Norway, and he concludes that one cannot lay too great stress on the importance of birds in the distribution of these forms. Sars's paper is, like many others, written in English.

The Myzostomata.—Nansen's beautifully-illustrated "Contributions to the Anatomy and Histology of the Myzostomata" is the last publication of the Bergens Museum. The text (sixty-eight pages) is in Norwegian, but a *résumé* in English of twelve pages places the substance of the article within reach. Two new species are described with great detail, the integument, nervous system, sensory organs, segmental glandular sacs, hook apparatus, alimentary tract, genital organs, complemental males, and hermaphroditism being discussed. Nansen comes into frequent conflict with Beard. Thus he does not believe with Beard that the diœcious forms of Myzostomata were the primitive type, and the hermaphrodite the secondary. He finds nothing resembling the epidermal sense organs or chitinous hollow rods described by Beard, nor can he accept Beard's account of the development of the nervous system by which the larval nervous system disappears and has nothing to do with that of the adult. Nansen considers the "suckers" as "segmental glandulous sacs," stating that they are ciliated, and lack the muscular walls described by Graff. Whether they are homologous with the segmental organs of the Annelids is left undecided. The fact that they do not communicate with the body cavity is the greatest objection to this view, but the ready answer to this is that, unless the cavities in which the ova are situated are such, the cœlom is absent.

Nansen's conclusions as to the systematic position of the

Myzostomata we quote (from the *résumé*) in full: "I cannot agree with Beard in regarding the Myzostomida as belonging to the Chætopods; there are too many dissimilar features in their structure, and I do not think that their development, as described by Beard, is 'quite that of a Chætopod.' The absence of a preoral ring of cilia, the relatively small development of the preoral lobe, and the great development of the body part of the larva are no insignificant differences; they show that the larva is not a little differentiated. The presence of a preanal ring of cilia is common to most Annelid larvæ, and the larvæ of Mollusca, Bryozoa, etc., also usually possess such a ring. In the absence of this ring, as well as in the rudimentary development of the preoral lobe, the larvæ of Myzostomida resemble those of Sipunculus; in their general structure there is, however, but little resemblance to be traced. I am inclined to regard the Myzostomida as a peculiar, distinct group, belonging to the Annelids, related to the Chætopods, but also showing a tendency towards some of the Arachnids (Linguatulida, Tardigrada, and perhaps Pycnogonida) and Crustaceans; they are sprung from the Trochophora; among the Archianelleda their ancestor has been chiefly related to that of Histiodrilus; on the other hand, it has also been related to that of the Arthropods, because the Myzostomida really show, in their structure, a tendency towards these. They are therefore one of those groups presenting the greatest interest as a subject for phylogenetic studies." The present reviewer fails to recognize the arthropodan resemblances of these forms. He is inclined to regard them as Annelids but remotely related to the Chætopods, parasitism having extensively modified them.

Anatomy of Echinorhynchi.—The Acanthocephali have been regarded as devoid of a digestive apparatus, and Lespès's discovery of what he considered the alimentary tract in the pyriform body in the proboscis of *Echinorynchus claviceps*, met with but little acceptance. Recently Megnin has been studying the subject, and gave the result of his researches before the Scientific Congress of Paris. In order to settle the question it was necessary to study these worms at a period before the development of the sexual organs, and when the nutritive system was in full function. Megnin found Echinorhynchi encysted in the cellular tissue of some Varanidæ from the Sahara. These proved to be in a larval stage and to have a digestive apparatus composed of two long convoluted tubes, each giving rise to numerous cæcal diverticula. The whole presents an analogy to the alimentary tract of the Trematodes. In some species, as the *E. brevicollis* found in *Balænoptera sibbaldi*, the digestive apparatus persists and acquires considerable development. In others it undergoes a degeneration and is to be sought in the "lemnisci," structures, heretofore of problematical nature, occasionally regarded as salivary glands. The larvæ have a rudimentary dorsal vessel, and this, with their proboscis and aquiferous apparatus (which, however, is well developed in the adult), shows the relation of the Acanthocephali to the Nemerteans or Rhynchocœla, while the digestive apparatus is more like that of the Trematodes. They can no longer be arranged with the Nematodes.

Argulus and Mortality of Fishes.—In the October number of this journal (vol. xx. p. 856) Mr. F. L. Washburn records an annually recurring extensive mortality of different species of fish in Lake Mille Lac, Minnesota, and describes as the cause of death a Siphonostome, the abdomen of which is furnished with an umbrella-like disk. Although this description hardly answers to an Argulus, yet I think the mode of occurrence and the great mortality point to the parasite being a member of this genus. I do not remember to have seen before an account of such devastations by Argulus in America, but similar accounts from Europe are not uncommon.

Mr. Washburn's note reminded me of the circumstance that two years ago Mr. A. C. Lawson, of the Geological Survey of Canada, brought me an account of a similar mortality of an undetermined species of Coregonus in the Lake of the Woods. He had preserved a number of the parasites, which I marked at the time *Argulus coregoni* Thorell (?), with the intention of determining afterwards whether the Canadian and Norwegian species should turn out to be identical. I find now that the characteristic copulatory ridges on the swimming legs of the male are very different in the Canadian species from those in *Argulus foliaceus* or *coregoni.* Dr. J. S. Kingsley has undertaken to see whether they agree with those in any described American form.

It may be of interest to note here that Leydig, in a recent communication to the *Zoologische Anzeiger* (No. 237), announces that the "poison-sting" of Argulus is in reality a sense organ, the "poison-duct" a broad nerve-tube, and the "poison-gland" a part of the fat body, so that the great mortality caused by Argulids is not to be attributed to any poison injected with the bite.—*R. Ramsay Wright, University College, Toronto,* January 8, 1887.

The Irish Red Deer.—In the March number of the *Zoologist* R. J. Ussher states that the Irish red deer lingered in the mountains of Knockmealdown, Counties Waterford and Tipperary, in 1774, and that its last haunt was Erris, County Mayo, where a few existed as late as 1847, when they were slaughtered for food by the famine-stricken peasantry. The only examples now left are preserved by Lord Kenmare and Mr. Herbert, of Muckross, in County Kerry. Among the occasional notes in the same magazine is one to the effect that a specimen of the American rusty grackle (*Scolecophagus ferrugineus*) was shot last autumn at Cardiff, Wales.

The Birds of India.—W. T. H. in Ward's *Science Bulletin* gives a short notice of the comprehensive ornithological survey of India that has for several years been carried on under the direction and at the expense of Mr. A. O. Hume, Secretary to the Government. Not only India, but British Burmah, Ceylon, the Malay Peninsula, and the Andaman Islands are included in this work. Besides doing a vast amount of field-work himself, and writing largely upon the subject, Mr. Hume has constantly kept from one to three corps of collectors in the field. Among the results of the work is a collection of over forty-five thousand bird-skins and unnumbered eggs at Simla, a superb four-volume work upon the Game Birds of India, and a work on the Nests and Eggs of Indian Birds. Mr. Wm. Davison, one of Mr. Hume's collectors, has found five hundred and eighty species in Tenasserim, and seven hundred and twenty-eight in British Burmah.

The Zoology of British Burmah.—Apropos of the preceding note comes a condensed account of the contents of the "Gazetteer of British Burmah," for which we are indebted to the *Revue Scientifique* of April 1. The mammiferous fauna presents many relations to that of the Sunda Isles, and includes four species of rhinoceros (*Rhinoceros sondaicus*, *Rh. indicus*, *Ceratorhinus crossii*, *C. sumatrensis*), the tapir (*Tapirus malayanus*) and *Orcella fluminalis*, a peculiar form of fresh-water dolphin, the anatomy of which has been fully described by Mr. Anderson. The bats hibernate as in Europe, and the genus Taphozous is particularly remarkable for the reservoir of fat stored in its tail for winter use. The roussettes do not hibernate.

Mr. E. W. Oates enumerates seven hundred and seventy-five species of birds, or a hundred more than is contained in all Europe. Of these, four hundred and fifty are also found in Hindostan, about one hundred of which are water-birds common to all the Old World, and winter visitants of Burmah; one hundred and fifty Malayan species, the northern limit of which is in Burmah; fifty species common to Burmah, Siam, and China; and sixty species at present supposed to be peculiar to Burmah. Some species, as *Pavo muticus*, *Megalurus palustris*, *Crypsirhina varians*, are found in Burmah and Java, while absent from Malacca; and species which in Hindostan occur only in the Himalayas at a considerable elevation, are here found at the sea-level. Birds identical with or closely related to those of Europe are few; among them are *Cotyle riparia*, *Chelidon urbica*, *Strix flammea*, the cuckoo, the wrens, the skylark, the pipits, and Saxicola.

The variety of the fauna is explained by that of the country, which is so varied that in an hour one can pass from grassy plains interspersed with rice-fields to the inaccessible precipices of granitic mountains; from a sea of bamboo jungles to the shady retreats of the virgin forest; and from the rich tropical vegetation of the coast to the pine-woods of the heights. Innumerable water-courses, interminable creeks, broad marshes, valleys alternately inundated and dried up; chains of mountains of various elevations diversify the surface of this province, giving it an unequalled array of flowers and fruits, birds, reptiles, insect, and molluscs.

The list of reptiles given by Mr. W. Theobald includes four crocodiles and more than seventy serpents, fifteen of which are among the most deadly, and shows that in this province Malayan and Indian species meet.

Among the fishes are many of those singular forms which seem as much at home on land as in water, such as the tree-climbing *Anabas scandens*, the Ophiocephalidæ and Trichogaster, which have a reservoir of air above their gills; Clarias, with an accessory respiratory apparatus; and Saccobranchus, with its long air-vessel extended across the dorsal muscles and communicating with the gills. The singular modifications of the organs of respiration in these fishes are an adaptation to the æstivation that follows the rains. Some, as *Oph. punctatus*, *Rhynchobdella aculeata*, and *Amphipnous cuchia*, live in summer buried two feet below the surface. After a storm fishes appear as if by magic; the Ophiocephalidæ glide, eel-like, from pond to pond through the wet herbage, and the *cuchia* lies on the ground hidden among the tall weeds, ready to spring into the water when disturbed. Many species, both marine and fresh-water, migrate regularly in accordance with the monsoons. Many mount to the mountain torrents to lay their eggs, and descend with the falling waters, while their young often remain above till the ensuing year. The siluroids of these rapid torrents are provided in their youth with a thoracic adhesive apparatus which disappears in the adult. *Oph. striatus* builds with its tail a nest among the aquatic plants beside the rivers. The nest is formed of the stems of herbs, which it bites off for the purpose; the male guards the eggs, and both take care of the young until they are large enough to go alone, when they chase them, and, it is said, even eat them if they refuse to disperse. The male of *Arius burmanicus* hatches the eggs, from fifteen to twenty, in his mouth, and during the incubation takes no food.

The prosobranchiate Gasteropoda are more numerous and varied in form than those of India; Cyclophoras attains two and a half inches diameter. Pomatias reappears here, and so also does the South American genus Nenia. The conchological fauna of British Burmah shows that the country was primitively an archipelago separated by arms of the sea, for upon the cretaceous hills of the valleys of Salween and Aracan occur isolated species, more numerous and interesting than those of the flat country that separates them. Two hills fifteen miles apart have a different molluscan fauna, and many forms are confined to this region. Besides the, to some extent, special fauna of these hills near Maulmain, three other molluscan faunæ can be distinguished: first, that of Aracan and southern Pegu, considerably resembling that of Assam and of the Himalayas; second, that of Upper Burmah and Thayet, resembling that of India, Central Asia, and China; and, third, that of Tenasserim, allied to that of Siam and the Malay Peninsula and connected with that of the Malayan Archipelago.

Description of a New Species of Wood-Rat from Cerros Island, off Lower California (*Neotoma bryanti* sp. nov.).—Mr. Walter E. Bryant has kindly presented to me the skin and skull of a wood-rat collected by him January 11, 1885, on Cerros Island, off Lower California, in lat. 28° 12′ N.

Concerning its capture he writes as follows: "On the shore of a small, shallow lake, about two thousand feet in altitude, on Cerros Island, I found a nest composed of the large dry leaves of the Maguey plant (*Agave*). It was built among small living plants of the same kind, which held it so firmly that I could not overturn it. It was about four feet high and as much or a little more in diameter at base. One of our party set fire to the structure, and while it was enveloped in flame and smoke a scorched rat ran out, which I shot. This was the only nest and only rat seen on the island."

This unfortunate circumstance, together with the fact that the skin was preserved in brine, explains the very poor condition in which it reached me. Enough remains, however, to show that the species differs remarkably from all known representatives of the genus in possessing a very dark belly, which, in this individual at least, is absolutely concolor with the back and sides. It may be added that the dark color of the under parts is in no way due to the scorching above mentioned. In all the previously described species the belly is pure white, or nearly white, in sharp contrast to the color of the upper parts.

This animal may be distinguished from its congeners by the following characters:

NEOTOMA BRYANTI sp. nov. *Bryant's Wood-Rat.* (Type No. $\frac{2838,}{1833}$ male, immature; Merriam Collection.)

Size large, about equal to that of eastern specimens of *N. floridana;* hind foot, 37 mm.; tail naked, its length uncertain, part of it being wanting; ears, apparently about the size of those of eastern *floridana*, but too imperfect to admit of measurement; head, throat, and body all round, dark slate color, almost sooty, exactly the same below as above, without trace of whitish on under parts. The feet may have been white, but it is impossible to tell from this specimen.

Behind each ear there is a patch of fulvous-tipped hairs, and it is possible that a superficial wash of this color was spread over much of the upper parts where the tips of the hairs have been singed off. The skull shows that the animal from which it came was full grown, but not quite adult. The grinding down of the molar teeth has only recently begun; consequently the deep plications along their sides are of unusual length. The enamel of the front upper molar forms two well-marked re-entrant angles of the inner side of the tooth. The pattern of the crowns of the molar teeth in both jaws is the same as in eastern specimens of *floridana* of corresponding age. The incisive foramina extend posteriorly beyond the plane of the anterior roots of the first molars. The pterygoid fossa is narrow, as in all the western forms of the genus,—very unlike its condition in eastern *floridana.* The condyloid process of the mandible is decidedly longer than in any of the other species. The zygomatic breadth is noticeably less than in the other members of the genus, which may be due in part to the immaturity of the individual, the zygomæ usually arching outward with age. The length of the molar series is conspicuously greater than in eastern skulls of *floridana* of the same size, and the molar series are much nearer together. This last character, however, is common to the western representatives of the genus.

Comparison with the western forms of the *floridana* type has been intentionally withheld because of the unsatisfactory if not chaotic condition in which these forms have been left by recent writers.

The new species is named in honor of its discoverer, Mr. Walter E. Bryant, of Oakland, California.

The following cranial measurements will suffice for present purposes (all measurements in millimetres):

Basilar length (from one of the occipital condyles to posterior edge of alveola of incisor of same side)	41.80
Basilar length of Hensel (from inferior lip of foramen magnum to posterior edge of alveola of incisor)	38.20
Occipito-nasal length (from occipital crest in median line to most anterior point of nasals, a measurement of very little value)	45.80
Greatest zygomatic breadth	22.50
Least breadth of frontals at interorbital constriction	5.50
Greatest length of nasal bones	17.70
Greatest width of nasal bones anteriorly	5.
Least width of nasal bones posteriorly	2.10
Least width of rostrum in front of zygomæ	4.80
Distance between outer rims of alveolæ of upper incisors	4.80
Distance from posterior rim of alveola of incisor to anterior rim of alveola of first upper molar	12.50
Distance from posterior rim of alveola of incisor to post-palatal notch ("palatal length")	20.80

Length of upper molar series measured on the alveolæ	10.40
Length of upper molar series measured on the crowns	8.30
Distance between alveolæ of upper molar series anteriorly	2.70
Distance between alveolæ of upper molar series posteriorly	4.40
Width of pterygoid fossa	2.
Apex of post-palatal notch to foramen magnum	17.
Height of cranium from inferior lip of foramen magnum	11.20
Fronto-palatal depth (taken at middle of molar series)	11.80
Greatest length of single mandible (exclusive of incisors)	29.30
Distance from incisors to first molar (on alveolæ)	6.30
Length of under molariform series measured on the alveolæ	9.80

C. Hart Merriam.

Zoological News.—Sponges.—Franz Vejdovsky points out that the recently described *Spongilla glomerata* Noll is the same as *Sp. fragilis* described by Dr. Leidy in 1851, and since described under several different names. He also gives a list of the known fresh-water sponges of Europe, enumerating eight species distributed among the genera Euspongilla, Spongilla, Trochospongilla, Ephydatia, and Carterius.

Echinoderms.—C. F. and P. B. Sarasin describe (*Zool. Anzeiger*, ix. pp. 80–82, 1886) the poison apparatus of the leather-urchin, *Cyanosoma urens*, a new genus and species. From the integument arise slender stalks bearing on their extremities strong connective-tissue poison-sacs.

Hubert Ludwig, in the same journal (p. 472), describes a six radiate condition in *Cucumaria doliolum*. Out of about one hundred and fifty half-grown specimens which he obtained at Naples, five had this peculiar structure, which affected not only the tentacles and ambulacra, but made itself evident in the internal organs. Such variations are extremely rare among the Holothurians.

Worms.—Dr. H. Schauinsland has a note (*Zool. Anzeiger*, ix. 574, 1886) upon the excretory and genital organs of the Priapulidæ, a family of Gephyrean worms, in which he points out that the so-called genital organs of these animals are not simply genital in function, but that, in fact, they are but portions of the ducts of the excretory organs, the epithelium of which gives rise to the genital products. He also states that these worms differ from the other Gephyrea in that the ova and spermatozoa do not escape into the body cavity, but are directly expelled into the sea.

In a paper read before the Linnean Society of New South Wales, June 30, 1886, Mr. J. J. Fletcher described six new species of earth-worms from Australia in addition to the three previously known. Of these, two belonged to the genus Perichæta, two to Notoscolex (a new genus), while two new genera, Didymogaster and Cryptodrilus, are created for the other two. Those previously known belong to the genera Lumbricus, Digaster, and Megascolides.

Prof. R. Ramsay Wright described at the meeting of the

Zoological Society of London, June 29, a new ectoparasitic Trematode under the name *Sphyranura osleri*. In its position it is intermediate between Gyrodactylus and Polystomium, and was found upon Menobranchus.

MOLLUSCS.—Kobelt in a "Nachtrag" to his former papers on the Molluscan fauna of Nassau (*Jahrb. Nassauichen Vereins*, Bd. 39, 1886) reviews, among other molluscs, the Unionidæ of Nassau, and describes, besides several varieties, *Unio rhenanus*, *U. kochii*, and *Margaritana freytagi* as new! Eight plates illustrate the paper.

The rarest of the Cypræas is possibly *Cypræa decipiens*. It was described by Edgar A. Smith in 1880 from a single worn specimen, which until recently was the only one known in any collection. It somewhat resembled a young *C. thersites*, and some had doubts as to the validity of the species. Recently several specimens have been obtained from the pearl-divers of Northwestern Australia, and these show conclusively that the species is a good one. It is said that the large green turtle feeds upon these molluscs.

Usually molluscs are very tolerant of those commensals, the oyster-crabs, which make their homes within their valves. At a recent meeting of the Zoological Society of London, Henry Woodward exhibited a specimen of the pearl-oyster (Meleagrina) from Australia in which a male Pinnotheres was enclosed in a cyst of pearl.

Bednal, in the *Transactions of the Royal Society of South Australia*, enumerates five species of Murex and one of Typhis as being found on those shores.

CRUSTACEA.—Collett, in a paper on Rudolphi's rorqual (*Balænoptera borealis*), records the presence (*Proc. Zool. Soc. London*, 1886) of the parasitic copepod, *Balænophilus unisetus*, on this whale. It is regarded as very rare, and has before been recorded but twice, and then on *Balænoptera sibbaldii*.

MYRIAPODS.—Berlese has a monograph of the Italian Iulids in the seventeenth volume of the *Bulletin of the Italian Entomological Society*.

According to G. Saint-Remy the brain of Scolopendra is much more like that of Hexapods than like that of either Crustacea or Arachnida.

ARACHNIDA.—At a recent meeting of the Entomological Society of Washington, Dr. Marx announced the finding of the European *Epeira diademata* in Minnesota.

At the meeting of the Linnean Society of London, November 18, 1886, Mr. A. D. Michael exhibited specimens of the mite Argus which had been received from Australia, and which were apparently identical with the celebrated *Argus persicus*, the bite of which is said to produce delirium and even fatal results.